Neutron reactions relevant to s-process nucleosynthesis

M. Heil

Forschungszentrum Karlsruhe, Postfach 3640, 76021 Karlsruhe, Germany

The last decades have seen an enormous progress in modelling astrophysical object which lead to a significantly improved understanding of various nucleosynthesis scenarios. This applies in particular for asymptotic giant branch (AGB) stars where about half of the heavy elements are synthesised by the main component of the s process. In order to test these models and to compare the model predictions with observational data accurate neutron capture cross sections of isotopes with mass numbers $A > 90$ are indispensable. This holds especially for nuclei near closed neutron shells and in the vicinity of branch points since the analysis of s-process branchings yields important information on stellar parameters like temperature, neutron densities, mass densities and even convection time scales during the s process. Within this picture neutron reactions on abundant light elements are also important since these act as neutron poisons, hence affecting the neutron balance in the star. Finally, also the most important neutron sources for the s process, ^{13}C(α,n)^{16}O and ^{22}Ne(α,n)^{25}Mg, will be discussed.

Email: heil@ik3.fzk.de